Improve the success rate of inserting and intubating the spiral nasojejunal tube with bare hands

Ling ZHANG, Hebao SHU, Jiao WANG, Shaomin HUANG*

The Seventh Affiliated Hospital of Sun Yat-sen University (Shenzhen), Shenzhen, Guangdong Province, PR CHINA

**Huang Shaomin, E-mail: huanghsm25@mail.sysu.edu.cn <https://orcid.org/0000-0002-8045-2087>*

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ABSTRACT

[Objective] To improve the success rate of spiral nasojejunal tube insertion through training of blind insertion of spiral nasojejunal tube with bare hands.

[Methods] A total of 49 patients (5 of them were secondary intubation) who were admitted to the emergency department of our hospital from April 2, 2019 to June 17, 2021 needed to undergo blind hand intubation treatment with a nasal jejunal tube. The nurses who were recruited to participate in Guangdong. The enteral nutrition intubation training class hosted by the Provincial Nursing Society Critical Care Committee has been divided into two groups: the experimental group after training (n=28) and the control group before training (n=21) at the aim of comparing the success rate of one-time catheterization of patients in the two groups.

[Results] The success rate of nurses' bare-handed blind insertion of the nasal jejunal tube increased from 43% to 86% ($p<0.01$).

[Conclusion] Carrying out the training of blind insertion of nasal jejunal tube with bare hands can improve the success rate of tube placement for nurses in emergency department.

KEYWORDS unarmed; blind insertion; spiral nasojejunal tube; placement; success rate

In recent years, with the improvement of living standards and increasing living pressure, people have increasingly higher requirements for the medical environment. Congestion in the emergency department has been recognized as one of the serious problems in the field of medical and health management^[1]. Due to the impact of the new coronavirus epidemic since December 2019, inpatients must have a new crown nucleic acid report before they can be admitted. The types of diseases in the emergency department are relatively complex, and the patients with more serious illnesses stay in the emergency department for a longer period of time, which makes the emergency nurses who take on the task of managing specialist pipelines aggravate. Among them, timely and effective enteral nutrition support is particularly important for patients with severe pancreatitis, tumor surgery, and long-term malnutrition. Enteral nutrition support in the emergency department is compared with enteral nutrition support after the patient is admitted to the ICU. Post-pyloric feeding, i.e. indwelling nasal

jejunal tube feeding can greatly reduce the risk of reflux and aspiration of the patients. Rehabilitation and shortening the length of ICU hospitalization are of great significance [2]. Compared with gastric feeding, small intestinal feeding can improve the tolerance of enteral nutrition, shorten the time to reach the target feeding amount, and reduce the incidence of pneumonia. Therefore, a number of clinical guidelines recommend that Critically ill patients with high risk of reflux and aspiration should choose intestinal nutrition" [3]. The success rate of one-time catheter placement is high, which can meet the nutritional needs of patients, with fewer complications, good prognosis, fast recovery, and high feasibility and safety [4]. Therefore, it is necessary and especially urgent to improve the success rate of the emergency department nurses' bare-handed blind insertion of the nasal jejunal tube.

Materials and methods

49 patients (5 of them were secondary intubation) who were admitted to the emergency department of our hospital from April 2, 2019 to June 17, 2021, and needed to be treated by blind intubation of the nasal jejunal tube with bare hands have been Included. The nurses who participate in Guangdong Province The enteral nutrition intubation training course hosted by the Critical Care Committee of the Society of Nursing (August 16, 2020) have been divided into two groups, the experimental group after training (n=28) and the control group before training (n=21), including 24 males and 25 females; aged 42-96 years, with an average age of (73±7.2) years; 16 cases of severe acute pancreatitis, 18 cases of infection with hypoproteinemia, electrolyte disorders, and 10 cases of after operation of malignant tumors, 3 cases of multiple organ failure syndrome and 2 cases of short bowel syndrome. Inclusion criteria: ①Age ≥18 years old; ②All have enteral nutrition indications and meet the indications for indwelling nasal jejunal tube; ③The patient is conscious and can cooperate, and the vital signs are stable: systolic blood pressure 90-140mmHg, heart rate 60-100 beats/min ④Patients or family members signed an informed consent form. Exclusion criteria: ①Using auxiliary tools such as endoscopy or ultrasound when inserting the tube; ②Injecting the jejunum into the jejunum by the patient's intestinal peristalsis after the naso-intestinal tube is inserted into the stomach.

Methods The nasojejunal tubes used by the selected patients are all CH10-145 (diameter 3.3mm, length 145cm) produced by Nutricia Pharmaceutical (Wuxi) Co., Ltd., and both groups of patients are nurses who have participated in unified training by the same group in the department. Carry out the tube placement operation.

Control tube placement method: ①Assess the condition and explain the purpose of the operation. The patient takes the right decubitus position and intravenously inject metoclopramide 10mg 5-10 minutes before the operation; ②After immersing the naso-intestinal tube in normal saline for 2-3 minutes, take it out with gentle movements, and slowly insert it with the patient's breathing. When there is resistance, pull back 5cm and adjust the direction before moving forward. When the insertion depth is about 75cm, start to inject 10ml of air/Kg (patient weight), the total air volume is less than 500ml, hold the naso-intestinal tube 4cm away from the nostril with one hand and slowly rotate 45 degrees, and then enter the tube in 2-4cm lengths at a time. Preset the length of the inlet tube (add 50cm from the hairline to the xiphoid process or tip of the nose to the earlobe and then to the length of the xiphoid process plus 50cm); ③Judge whether the naso-intestinal tube is in the intestine: Use a syringe to inject

air into the naso-intestinal tube, and at the same time use a stethoscope to auscultate the upper abdomen for the sound of air and water, or inject about 20ml of normal saline into the naso-intestinal tube, and take out the saline to test the pH range with a pH test paper, or put the end of the naso-intestinal tube into a container filled with water, and then observe whether there are any bubbles overflowing; ④ auscultate the stomach-left upper abdomen, proximal duodenum-right upper abdomen, and upper end of the distal duodenum empty field-left abdomen to determine the tip position of the catheter during air injection; ⑤ Slowly Remove the guide wire, fix the position of the catheter, and record the depth of the catheter; ⑥ The position of the tip of the naso-intestinal canal is determined by routine abdominal X-ray.

The method of tube placement in the experimental group: ① Assess the condition and explain the purpose of the operation. The patient takes the right decubitus position, raises the head of the bed $>30^{\circ}$, and intravenously is injected metoclopramide 10mg 5-10 minutes before the operation; ② Dip the tube and remove the nose the intestinal tube immersed in saline, and the guide wire is pushed back to the tip and fixed; ③ Predict the length of the naso-intestinal tube to be inserted into the stomach, whose distance is generally from the anterior hairline to the xiphoid process of the sternum or from the earlobe through the tip of the nose to the xiphoid process of the sternum, that is about 45-55cm scale which is regarded as the first marking line. According to the physiological and anatomical positioning of the digestive tract, add 25cm to pass the pylorus (approximately 70-80cm), and use this scale as the second marking line; pass the ligament of flexion into the jejunum to be added About 25cm; ④ Insert the tube slowly and gently according to the indwelling gastric tube operation method, and stop at the epiglottis. Instruct the patient to swallow and then send the tube to the first marking line. After confirming that the naso-intestinal tube is in the stomach (confirm whether the naso-intestinal tube is in the stomach, and the method is the same as the control group), inject air into the stomach (different from the control group, the experimental group does not need to inject a total amount of less than 500ml of air at one time, but intubation at the same time as the air injection), and then at a rate of 1-2ml each time with the patient's breathing movement, slowly rotate in the same direction and push it to the second marking line. After auscultation confirms that the tip passes through the flexion ligament and reaches the jejunum, the naso-intestinal tube is advanced 25 cm at a speed of 3-5 cm each time; compared with the control group, after confirming that the naso-intestinal tube is in the stomach, the naso-intestinal tube advance forward while injecting about 10ml of gas each time.)—Pylorus (about 70cm)—duodenal level (about 80cm)—jejunum (about 90cm); ⑤ After auscultation confirms that the naso-intestinal tube has reached the jejunum, use the PH test paper test method or vacuum test Method to determine whether it reaches the jejunum. PH test paper detection method: draw back the liquid in the tube, observe the PH result, intestinal juice $\text{PH}>7$, gastric juice $\text{PH}<5$. Vacuum test method: Inject about 100ml of air into the naso-intestinal tube, and withdraw less than 20ml to confirm whether the naso-intestinal tube has passed the pylorus; ⑥ Fix the naso-intestinal tube, pull out the guide wire, and record the depth of the tube; ⑦ Routine abdominal X Line to determine the position of the tip of the naso-intestinal tube.

Observation index: Number of successful cases of catheterization: the standard of successful catheterization is that the patient's abdominal X-ray film after catheterization shows that the tip of the catheter reaches the duodenum or jejunum through the pylorus. Tube time is 15-20 minutes.

Statistical methods All data were statistically analyzed using SPSS19.0 statistical software. The count data were described by examples (%), and the χ^2 test was used. $P < 0.05$ was considered statistically significant.

Results

According to the statistics of nurses in the emergency department in the past year after participating in the training, compared with the success rate of nasal jejunal tube placement before training, the one-time success rate of catheter placement has increased from 57% to 86% before and after training. There are statistical differences between before and after training. Academic significance ($P < 0.05$).

Table 1 Comparison of the first-time success rate of tube placement before and after training

Group	Number	One-time success(%)	One failed(%)	One-time success rate (%)
Control	21	12(57.14)	9(42.86)	57.14
Test	28	24(85.17)	4(14.29)	85.71
χ^2 value				5.026
P value				<0.05

Discussion

In recent years, with the development of nutritional support theory and practice, more and more attention has been paid to the treatment of severe early enteral nutrition support^[6]. Blind placement of nutritional tubes through the nose is simple and easy, with few complications and high success rate, also with being more economical, convenient^[7]. The technique of bare-handed blind insertion of the nasal jejunal tube is a commonly used technique for enteral nutrition. It is non-invasive, easy to operate, and does not require special equipment. In recent years, enteral nutrition has been gradually applied in patients with severe pancreatitis^[8]. As for patients in the emergency department, there are many types of diseases and complex conditions, and the development of the disease is difficult to predict, and the technical requirements for operators are higher. At the same time, the patient's own subjective and objective conditions are also one of the important factors for the success of the intubation, including the patient's compliance, pyloric sphincter spasm, because the catheter is easily blocked by the tight spasm pyloric sphincter when the nasal jejunal tube is inserted blindly, and it is not easy to pass for such patients, it is necessary to find a way to relieve pyloric spasm in critically ill patients, so that the catheter can pass through the pylorus smoothly^[9]. In this study, intravenous metoclopramide 10mg was used as preparation for intubation. Communicate with patients before the operation, do a good job of health education before intubation, and obtain the understanding and cooperation of patients and their families. During the intubation process, it is necessary to observe the patient's response in time to improve the efficiency of the intubation while ensuring gentle movements. In the process of insufflation, try to inject a small amount of times as much as possible, that is, to avoid excessive gas in the patient's stomach or the final bloating caused by repeated intubation, which will increase the risk of intubation, and prevent the stomach from being over-expanded and causing the pylorus to move upward. The posterior displacement increases the difficulty of intubation and the later period of abdominal X-rays to determine the position of the catheter tip, which can also greatly shorten the catheterization time. During the catheterization

process, one person is intubated and the other is auscultating. How to judge whether the tip of the catheter has passed the pylorus: auscultate the upper part of the stomach, if the sound of air passing over water is obvious, and the upper part of the umbilicus is louder than the upper part of the stomach, the tip of the catheter is mostly inside the stomach; if auscultation of the upper part of the stomach, the sound of air and water is weak, or almost no sound. The sound of the upper part of the umbilicus is more pronounced, and the tip of the catheter has mostly passed the pylorus (note that the strongest sound that can be heard is the position where the tip of the catheter reaches). This can preliminarily determine the position of the indwelling nasojejunal tube. Improve the level of reading, avoid repeatedly taking abdomen and chest x-ray plain film to determine the position, and reduce the economic burden of patients.

Summary

This study combines the methods of the professors in the enteral nutrition catheterization training class hosted by the Critical Care Committee of the Guangdong Nursing Society and the clinical experience of our department, and selects methods such as internal training, demonstration operations and business rounds to increase the number of intubation nursing staff in order to improve the success rate of blind nasojejunal tube insertion[10], by analyzing the influencing factors of the success of intubation, summarize the methods, and conclude that the training of bare-hand blind nasojejunal tube insertion can improve the success rate of emergency department nurses.

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